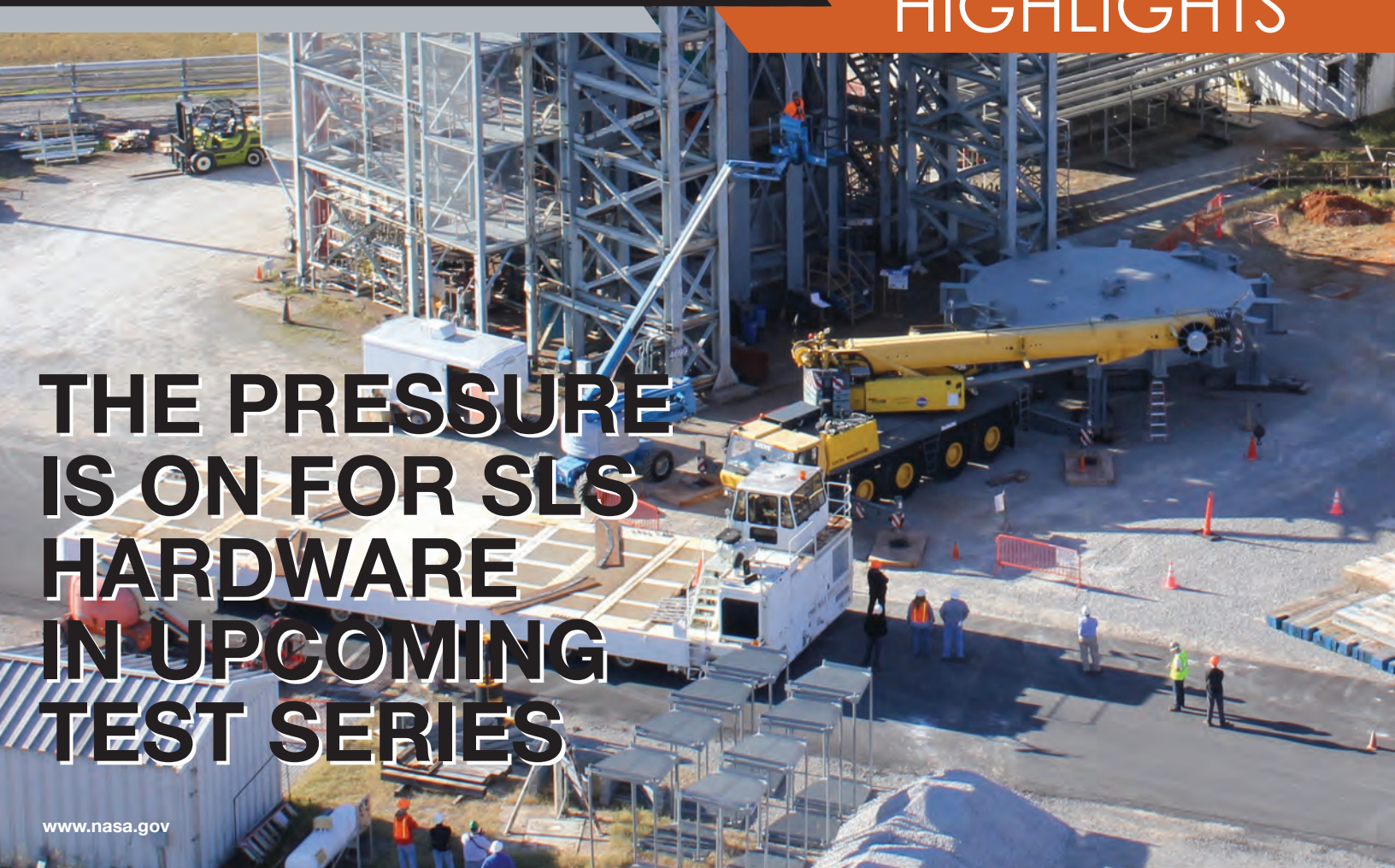
National Aeronautics and Space Administration

OCTOBER 2016

SPACE LAUNCH SYSTEM HIGHLIGHTS



THE PRESSURE IS ON FOR SLS HARDWARE IN UPCOMING TEST SERIES

SLS LAUNCH VEHICLE STAGE ADAPTER GOES IN TEST STAND

A test version of the launch vehicle stage adapter (LVSA) was moved to a 65-foot-tall test stand at NASA's Marshall Space Flight Center in Huntsville, Alabama. The LVSA will connect the core stage of the SLS rocket to the interim cryogenic propulsion stage (ICPS). The ICPS is a liquid oxygen/liquid hydrogen-based system that will give Orion the big, in-space push needed to fly beyond the moon before it returns to Earth on the first flight of SLS in 2018. The test version LVSA will be stacked with other test pieces of the upper part of the SLS rocket and pushed, pulled and twisted as part of an upcoming test series to ensure each structure can withstand the incredible stresses of launch.

Read the full story at: bit.ly/2dVHlFi

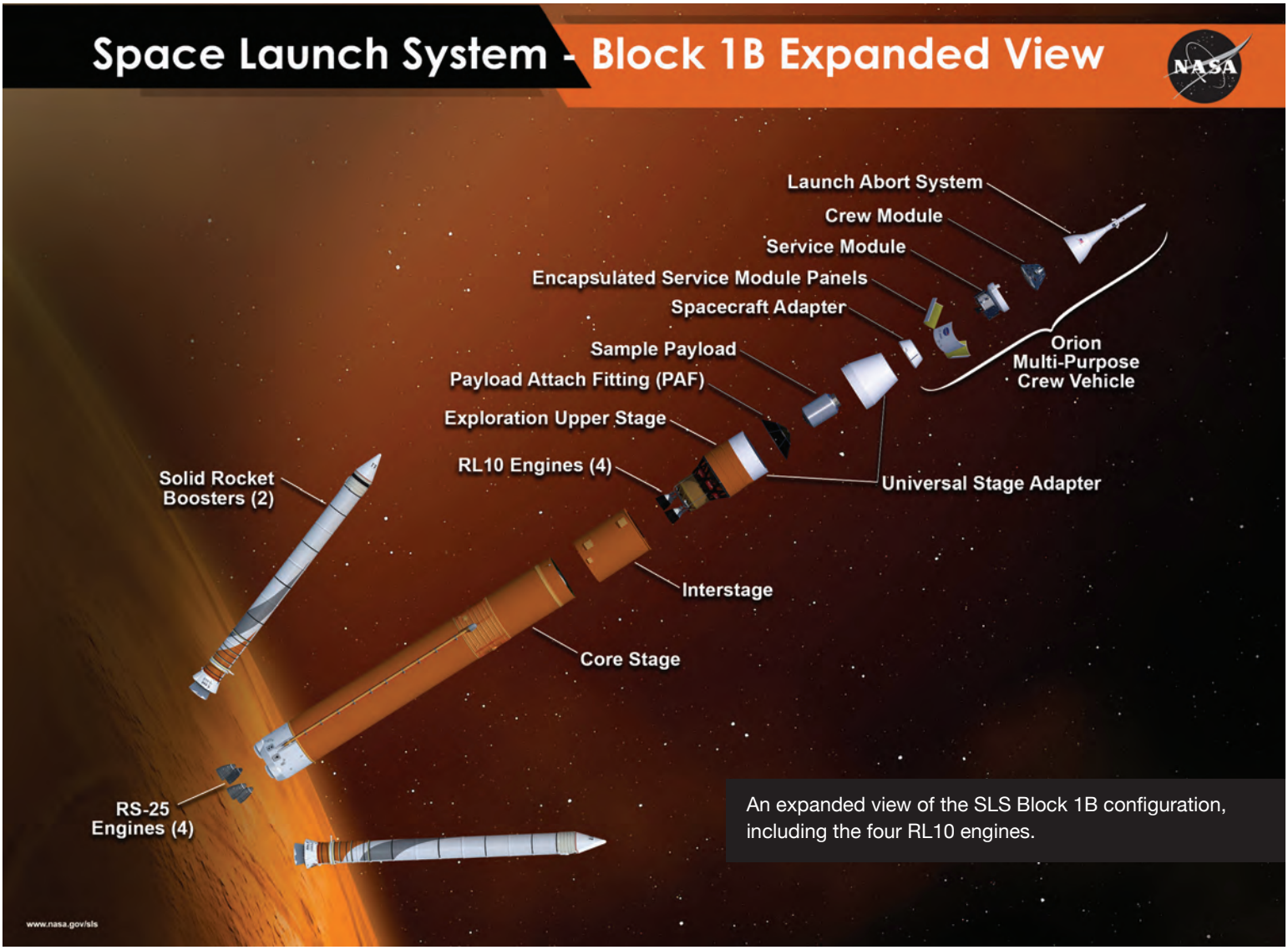
Watch the start-to-stack process for the hardware at: bit.ly/2efu5tD

The SLS LVSA is lowered into the test stand at Marshall.

PROVEN ENGINE PACKS IN-SPACE PUNCH FOR NASA SLS

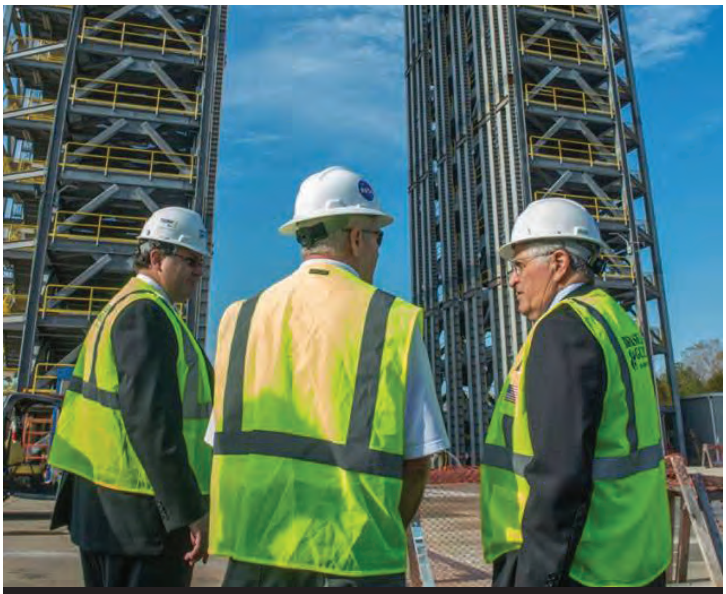
SLS will rely on a proven upper stage engine – the RL10 – for its first mission with the agency's Orion spacecraft in late 2018. The SLS Block 1 rocket will use one RL10B-2 engine, the same engine currently used by the Delta IV rocket, as a part of the interim cryogenic propulsion stage (ICPS).

As the rocket evolves to a more powerful Block 1B configuration, an exploration upper stage (EUS) will be added. The EUS will use four RL10C-3 engines, and the upgraded rocket will send astronauts tens of thousands of miles beyond the moon to explore deep-space, paving the way for NASA's Journey to Mars.
Read the full story at: bit.ly/2fnROdQ



An expanded view of the SLS Block 1B configuration, including the four RL10 engines.

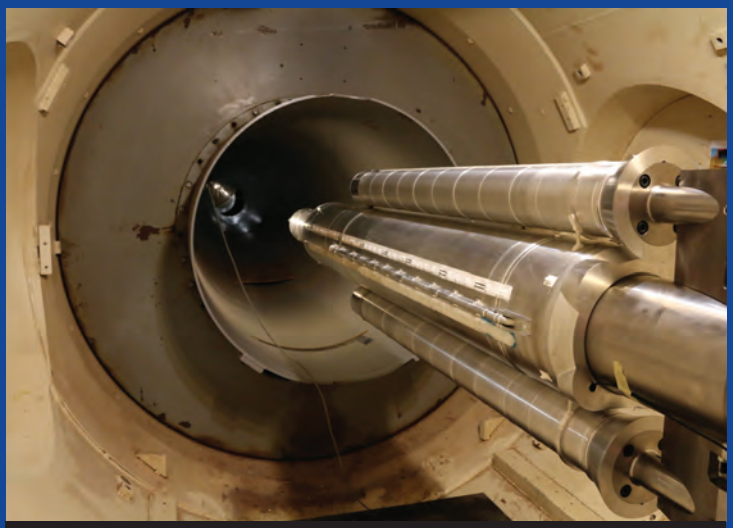
APOLLO ASTRONAUT GETS A LOOK AT THE FUTURE OF SPACE EXPLORATION



While touring the Marshall Space Flight Center, Apollo astronaut Harrison Schmitt, right, visited a new test stand designed to test the SLS liquid hydrogen tank. The test stand will push, pull and twist the 130-foot-long tank to ensure it can withstand the incredible stresses of launch.

Schmitt, right, the only scientist to walk on the moon, also discussed secondary payloads with Marshall's Steve Creech, SLS's deputy manager for Spacecraft/Payload Integration and Evolution. During Exploration Mission (EM-1), the first integrated flight of SLS and Orion, 13 small cubesats will hitch a ride into space.

NASA USES TUNNEL APPROACH TO STUDY HOW HEAT AFFECTS SLS ROCKET



A 9 1/2-foot (3-percent scale) full model of the initial configuration of the SLS rocket goes into a shock tunnel for testing at CUBRC Inc. in Buffalo, New York. NASA engineers have teamed with CUBRC to better understand and analyze how the SLS is heated as it ascends into space. **Read the full story at: bit.ly/2eNvPeu**

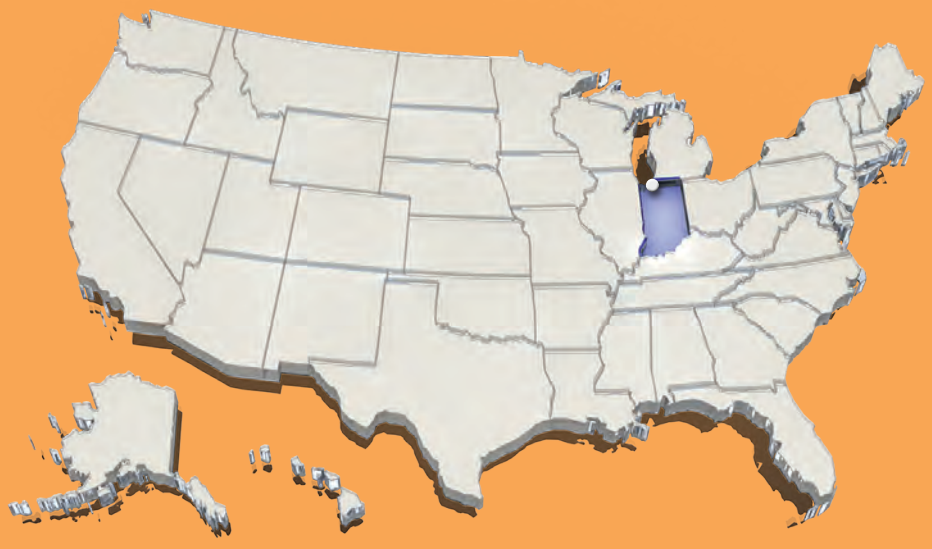
Schlieren imaging -- an optical technique for visualizing supersonic flow around objects -- is used during the aerodynamic heating tests. This image shows flow over the Orion launch abort system at a 15-degree angle of attack.

B-2 TEST STAND ON SCHEDULE FOR SLS GREEN RUN TESTING

Major construction projects are closing out and all is on schedule for the B-2 test stand at NASA's Stennis Space Center near Bay St. Louis, Mississippi. The stand has been undergoing major renovations for SLS green run testing, where the core stage and four RS-25 engines will fire up together for the first time.

Read the full story at: bit.ly/2dVTCtE

SPACEFLIGHT PARTNERS:
Manufacturing Technology Inc. (MTI)



LOCATION:
South Bend, Indiana

NUMBER OF EMPLOYEES:
140 employees in the United States; 225 total employees globally

WHAT THEY DO FOR SLS:
MTI supports the friction welding of the injector posts for the RS-25 powerhead main injector, using a Vertical Rotary Friction Welding machine that was originally built for Aerojet Rocketdyne during the shuttle program in the 1980s and upgraded for SLS specifications. Each injector has 600 posts that need to be consistently friction welded.

SLS AT VON BRAUN SYMPOSIUM

A panel of experts talk about payloads for SLS exploration missions Oct. 26 at the Wernher von Braun Memorial Symposium in Huntsville, Alabama. The annual event features panel discussions and guest speakers reflecting government, industry, academia, business and international perspectives on space exploration. Participating on the panel are, from left:

- **Steve Creech**, deputy manager, SLS Spacecraft/Payload Integration and Evolution
- **Jitendra Joshi**, lead for technology integration, Advanced Exploration Systems Division, Human Exploration & Operations Mission Directorate, NASA Headquarters
- **Brian Mulac**, mission manager, NASA Marshall
- **Joseph Pelfrey**, manager, Exploration and Space Transportation Development Office, NASA Marshall
- **Monsi Roman**, Centennial Challenges Program Manager, NASA Headquarters

REINVENTING SPACE 2016

SLS's Kimberly Robinson gives a presentation called "Space Launch System: A Transformative Capability for Space Exploration" at the Reinventing Space 2016 conference. The audience of approximately 80 attendees included representatives of international aerospace industry and academia.

FOLLOW THE PROGRESS OF NASA'S NEW LAUNCH VEHICLE FOR DEEP SPACE:

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COMING IN NOVEMBER:

ICPS structural test article installed in Marshall test stand

EM-1 booster forward segment cast

SLS booster aft skirt refurbishment work